CLAIMS

What is claimed is:

1. A speed sensor instability detection and correction system for use with a vehicle, comprising:

a speed sensor output variation extractor that monitors and records change in output of a speed sensor over time, thereby extracting a speed sensor output variation;

a speed sensor output variation comparison module that detects speed sensor instability based on a comparison between the speed sensor output variation and a predetermined threshold; and

an output speed determination module in communication with said speed output variation comparison module that selectively determines output speed based on whether speed sensor instability is detected.

2. The system of claim 1 wherein said speed variation comparison module compares speed output variation to the predetermined threshold over a predetermined amount of time, and detects speed sensor instability if the variation exceeds the threshold for the predetermined amount of time.

3. The system of claim 2 wherein said speed variation comparison module continues to detect speed sensor instability until the variation no longer exceeds the predetermined threshold for a second predetermined amount of time.

4. The system of claim 1 wherein said output speed determination module determines output speed as a Kalman filtered output of the speed sensor when speed sensor instability is not present.

5. The system of claim 1 wherein said output speed determination module determines output speed as a median filtered output of the speed sensor when speed sensor instability is present.

6. The system of claim 1 wherein said output speed determination module calculates output speed based on a maximum output of the speed sensor and a transfer gear of the vehicle when speed sensor instability is present.

7. A vehicle, comprising:

a speed sensor that detects a speed of the vehicle;

a speed sensor instability detector that detects speed sensor instability based on a change in output of said speed sensor over time; and

an output speed determination module that employs a median filter to filter output of said speed sensor when said speed sensor instability detector indicates speed sensor instability.

8. The vehicle of claim 7 wherein said speed sensor instability detector makes a comparison between the change in wheel speed over time and a predetermined threshold, and detects instability based on results of the comparison over time.

9. The vehicle of claim 7 further comprising a wheel slip detector that calculates speed ratio based on the filtered output of said speed sensor, calculates axle torque based on the speed ratio, calculates an output derivative based on the median filtered output speed, calculates an expected derivative based on the axle torque, and determines whether wheel slip is present by comparing the output derivative to the expected derivative.

10. The vehicle of claim 7 wherein said output speed determination module employs a Kalman filter to filter output of said speed sensor when said speed sensor instability detector does not indicate speed sensor instability.

11. A method for detecting wheel slippage based on output speed of a wheeled vehicle, comprising:

determining whether output speed instability is detected;

generating a median filtered output speed when output speed instability is detected; and

determining whether wheel slippage is present based on the median filtered output speed when output speed instability is detected.

12. The method of claim 11 wherein said determining whether output speed instability is detected includes monitoring change in a pulley speed sensor output signal over time.

13. The method of claim 12 wherein said determining whether output speed instability is detected further includes making a comparison between change in pulley speed over time and a predetermined threshold.

14. The method of claim 13 wherein said determining whether output speed instability is detected further includes detecting instability based on results of the comparison over time.

15. The method of claim 11 wherein said generating a median filtered output speed further includes filtering an output signal of a pulley speed sensor with a median filter.

16. The method of claim 11 wherein said determining whether wheel slippage is present includes calculating speed ratio based on the median filtered output speed.

17. The method of claim 16 wherein said determining whether wheel slippage is present further includes calculating wheel axle torque based on the speed ratio.

18. The method of claim 17 wherein said determining whether wheel slippage is present further includes:

calculating an output derivative based on the median filtered output speed; and

calculating an expected derivative based on the wheel axle torque.

19. The method of claim 18 wherein said determining whether wheel slippage is present further includes comparing the output derivative to the expected derivative.

20. The method of claim 11 further comprising:

generating a Kalman filtered output speed when output speed instability is not detected; and

determining whether wheel slippage is present based on the Kalman filtered output speed when output speed instability is not detected.